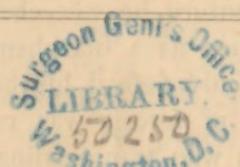


Bigelow (H. R.) Compt'n Libt of Author

THE PHYSIOLOGY  
AND  
PSYCHOLOGY OF THE BRAIN.

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The province of physiology in all ages, has been the localization of the functions of life, circulation being ascribed to the heart, respiration to the lungs, and digestion to the stomach, but it was not until after the days of Buffon, who described the brain as a mucous substance unworthy of notice, that the intimate causative relation between the cerebral hemispheres and thought received an enlightened investigation, and here tradition hypothecated an intangible entity, which presided over the intellectual outcome ; the intellect and moral power were not the effect of cerebral re-action, but the manifestation of a misty, spiritual vagary governing the physico-chemical changes. But a later period, and a more unbiassed habit of thought, has taught us to seek the solution of the mysteries of vital phenomena, in the general laws of physics and mechanics.

As in the fourth century, he who cherished a belief in antipodes was shunned as a blasphemer, so until very recently, he who would defend his belief in evolution and the correlation of forces, was railed at by that school of theologians who transcending their legitimate limits of thought, tortured their brains with the *order* of Nature, as well as its cause, and was hesitatingly patronized by society. But now that science is exerting its supreme control, the old chains of tradition are rapidly unloosening : religious toleration is supervening upon the exaltation of God, which arises from a study of geology, and from a severance of the unalterable belief in the accuracy of the Mosaic Law. The heresies of yesterday are the creed of to-day, and while we see the human institutions of religious sects, change with every century

and every variation of latitude and longitude, Science keeps on its way, unswervingly, pointing upward, higher and higher, to a final perfection. So that, now, among men whose opinion is valuable, there is no appeal from the theory of evolution among men, among animals and in the vegetable kingdom, just as we also rest assured in the verity of the "Nebular Hypothesis." As then we study matter in all its relations, as we approximate to just theories of force, which is simply matter in motion, by comparisons with similar phenomena, so, too, we must correlate these attested facts, with the hypothetical theories of brain force, and from the relation deduce new theories. Descartes recognizing this truism, and adopting the views of Galen, locates in the brain the function of the distribution of "animal spirits," the distribution to those parts in need of certain stimuli being effected through the nerves. But over and above this power, was an all-governing essence, which had its seat in the pineal gland and which he called *soul*. This great Philosopher, and I may add physiologist as well, recognized a physiological mechanism, and over that the thinking power of a *soul*. This view prevailed among those of like persuasion for many years; the brain was merely the substratum of thought: while the physiological order of the correlation of forces, was plainly visible, even by the greatest skeptic, in all the other viscera of the body, it was held that thought and will, must be referred to other methods of analysis. This was the great mistake arising from a just apprehension of chemical mechanism and metaphysical phenomena.\* De Blainville fell into a similar error, and held that in certain cases of insanity the reason might be affected essentially, while the brain remained absolutely normal, and that conversely, there might be unimpaired intellectual vigor in persons with indurated or softened brains.

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\* De Blainville: Lecture on Zoology.

Modern science has destroyed such illusive doctrines ; and while there is much material hypothesis, in the theories of those eminent investigators in this particular field, yet by a judicious combination with objective metaphysical study, and by an educated observation of the various forms of the "mind diseased," a great preponderance of probability will result.† As the Bacteria and Torula, are spontaneously generated, as we have reason to believe that the amœba can boast no longer of an ancestral race, antedating primeval man, so, the human mind, evolved by purified generalizations of heredity, is progressively upward, and we are justified in the belief, that these speculations of to-day, relative to the functions of the brain, will in after-generations, receive the testimony of direct proof. There are certain facts, which have already been established by experiment. We know that consciousness resides in the cerebral lobes, while the lower portions of the brain, contain nervous centres destined for organic functions of a lower kind. In the lower and higher orders of the animal kingdom, removal of the cerebrum does not impair motion, though certain stimuli are required to develop it, and the motion, once originated, continues until forcibly arrested.‡ If the movement of one limb be stopped, the other limb will cease moving also. Pigeons when deprived of the cerebrum, will perform vital functions, though they require to be fed, and the instinct returns with the regrowth of the cerebrum. Animals deprived of the cerebral lobes also exhibit a forced tendency to maintain their equilibrium, showing that the cerebellum alone originates this power. There are, among the encephalic centres at the base of the brain, centres of co-ordination and direction of movement, which preside over the details of external life (walking, flying, &c.) Now the motions of the body originated by these centres, under the influence of the brain are of two

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† Bastian : Beginnings of life.

‡ M. Onimus; Physiology of nervous system.

orders : those of instinct or hereditary acquisition (Herbert Spencer) and those of habit. If you remove the cerebral lobes of a duck that has never been in the water, and then place it in water, it will swim regularly, but it will not, like an old duck deprived of its cerebrum, make certain habitual movements of the neck. The eye is merely the medium, through which a sensation is conveyed to the brain, or sensory tract, and converted into an impression, and this is so intricately interwoven with tactile sensibility, that the one exists but imperfectly without the other. Color, is the abstraction formed by ~~one~~ <sup>our</sup> mind, out of the number of millions of undulations of light per second, impinging upon the retina. Sound is the transmitted impression of the auditory nerve. A large tree falling in a forest would occasion no noise, unless there were some one by to hear it. Lesions of certain kinds, within the brain, produce certain well authenticated results; softening of the peduncles brings about a peculiar gait, extravasation into the corpus striatum, hemiplegia, multilocular cerebral sclerosis, a species of paralysis agitans. These are all incontrovertible facts revealed by recent intellectual experiments. When we stretch out farther into the hidden land, and strive to locate the various phases of thought, the will, the intellect, we must deal in individual hypothesis, which will differ in the direction of each investigator's bias.

The absolute connection between mind and matter, is as yet beyond the pale of human inquiry, and hence however erudite and extended our studies, we must all be arrested at that final change in molecular disposition which "immediately and causatively precedes inchoate consciousness." Yet, at a very early stage of physiological inquiry the Seat of the Soul or Conscious Principle,\* was a theme of elaborate and ingenious hypothesis. Hippocrates and Hierophilus placed it in the fibres of

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\* Noble : Human Mind.

the brain; Democritus in the region of the temples; Strabo in the space between the eyebrows; Epicurus allocated it in the breast; Diogenes in the left ventricle of the heart; the Stoicks, with Chrysippus, in the whole heart; Empedocles placed it in the blood; Plato and Aristotle connected the soul with the whole body; and Galen suggested that each part had its separate soul Dr. Gall towards the close of the last century, was the first to enunciate clearly the doctrine, that different parts of the encephalic mass fulfil different functions. Just prior to the publications of Gall's doctrine, Prochaska had written "Since the brain, as well as the cerebellum is composed of many parts, variously figured, it is probable that nature, which never works in vain, has destined those parts to various uses; so that the various faculties of the mind seem to require different portions of the cerebrum and cerebellum for their production."

It would consume too much time, to enter into a detail of this system of *Phrenology*, it is sufficient to know, that it has not received from investigation that confirmation which was anticipated for it—some of its great underlying principles are doubtless correct, and outward arrangements claim attention—we know that a high broad forehead, with prominent frontal eminences, is indicative of intellectual ability; a retreating forehead, low, and running to a point at the cranial vertex, implies a low grade of humanity; and if a link were needed to substantiate the theory of evolution between men and animals, we could not be far wrong in suggesting the Theroid Idiot. Then followed the cranioscopy of Dr. Carus\*—consisting of a three fold division of the encephalon, each corresponding to certain psychical qualities. But the defects of this system, were so numerous and obvious, that it has never received great attention, although it

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\* Grundzüge einer neuen und wissenschaftlich begründeten cranioscopie. Stuttgart, 1841.

seems to have furnished the germs of the existing teachings. The present tendency is to look upon mind as the force generated by the chemical re-actions in the vesicular neurine of the cortical and hemispherical cells of the brain. This is a very probable and scientific theory, and it is by adopting some such concession only, that we can hope to treat effectually mental diseases ; for as in every other other disease in the body, the remedies are applied to the suffering viscera, so too, in this, the highest of all, we must address ourselves to the brain. If this be materialism, then it is the essence of human charity. If mind be a spiritual gift, beyond the ken of investigation, then every case of mental alienation must be treated as such, and left to perish in its wretchedness, all brain lesion passed by unnoticed, and herein Theology by going beyond the pale of its legitimate offices, may tend to cause great evil, and seduce the ignorant from Christian duties. Starting out then, with this theory of mind, we at once ignore the reception of any such teachings, as those of *intuitive ideas*. The new born babe, possesses not these. It suckles by the reflex operation of the nervous action of the spinal cord. It *learns* to walk, the reflex impression, occasioned by the pressure of the foot upon the floor, excites coordinated movement, and through a better experience, the automatic habit is acquired. The moral test of Right and Wrong, is the generalized experience of previous generations, indeed we might almost say that the mind itself was an ancestral product. The child is taught to recognize, that certain actions will call forth reproach or punishment, and hence avoids them. The abstract idea of virtue, which Socrates called "The harmony of a man's powers" ; Kant, "a will in harmony with the universal moral sentiment" ; and which utilitarianism refers to a species of self-interest within a man, is acquired. The *Will*, is a product of mind, and hence as a dependent force, the paradox of Free Will becomes apparent. In certain cases of insanity, a person may

have a thorough appreciation of Right and Wrong, yet, by uncontrollable force of Will, be urged into crime, despite himself. Herein lies the great injustice of this olden, judicial test. Maudsley defines the Will to be "the desire or aversion, sufficiently strong to occasion action, upon reflection." In nature, certain stimuli, call forth a resultant force. In the brain, the necessary stimulus, brings about a like result. In certain cases of melancholia, the patient however great his riches, may imagine himself a pauper. The one aim of his life has been the acquisition of wealth—for this end all his mental power has been put into action, the fluctuations of the money market have depressed his spirits, while an influx of wealth has unduly exalted him, and just as the hand, by constant use, may become palsied, so the mind by the constant inspection of this one idea, breeds unhealthy chemical action in the cells of the brain and originates as delusion that which the patient has so feared and warred against.\* As I have shown elsewhere the integrity with which a person's ideas re-act outwardly towards nature, and the measure of his proto-typical cerebral arrangement will be the standard of his mental trustworthiness. As in nature, there is a conservation of force, so too, in nature's work, the brain, an idea which re-acts but partially externally prolongs its tension in a nerve cell and becomes consciousness, or it may impress itself, to react at some future time as memory, or by its association with a particular physical condition, may for ever call forth pain or laughter, when a similar condition obtains.

In cases of melancholia, where there is morbid self-introspection and religious depression, the first aim in the treatment, is to withdraw the mind from this concentration upon itself, to interest it and to bring it into harmonious relationship with nature, and to excite its normal tone, by association with healthy minds.

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\* The insanity of Hamlet, a psychological study.